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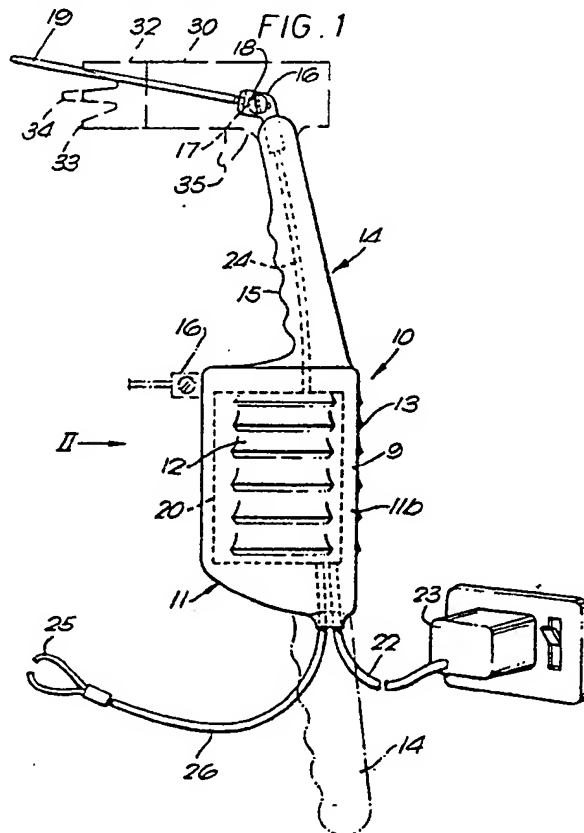
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(54) Welding apparatus

(57) Arc welding apparatus comprises an electrode holder 10 having a transformer 20 in a lower part 9 of the casing 11 thereof. The upper part of the casing 11 includes a handle 14 supporting at its upper end an electrode holding element 16. The transformer 20 is connected to a mains cable 22 which is connected at its end remote, from the casing to a plug 23 which may contain circuitry to step up the mains frequency to 300 Hz. The electrode holder may comprise a vibrating head.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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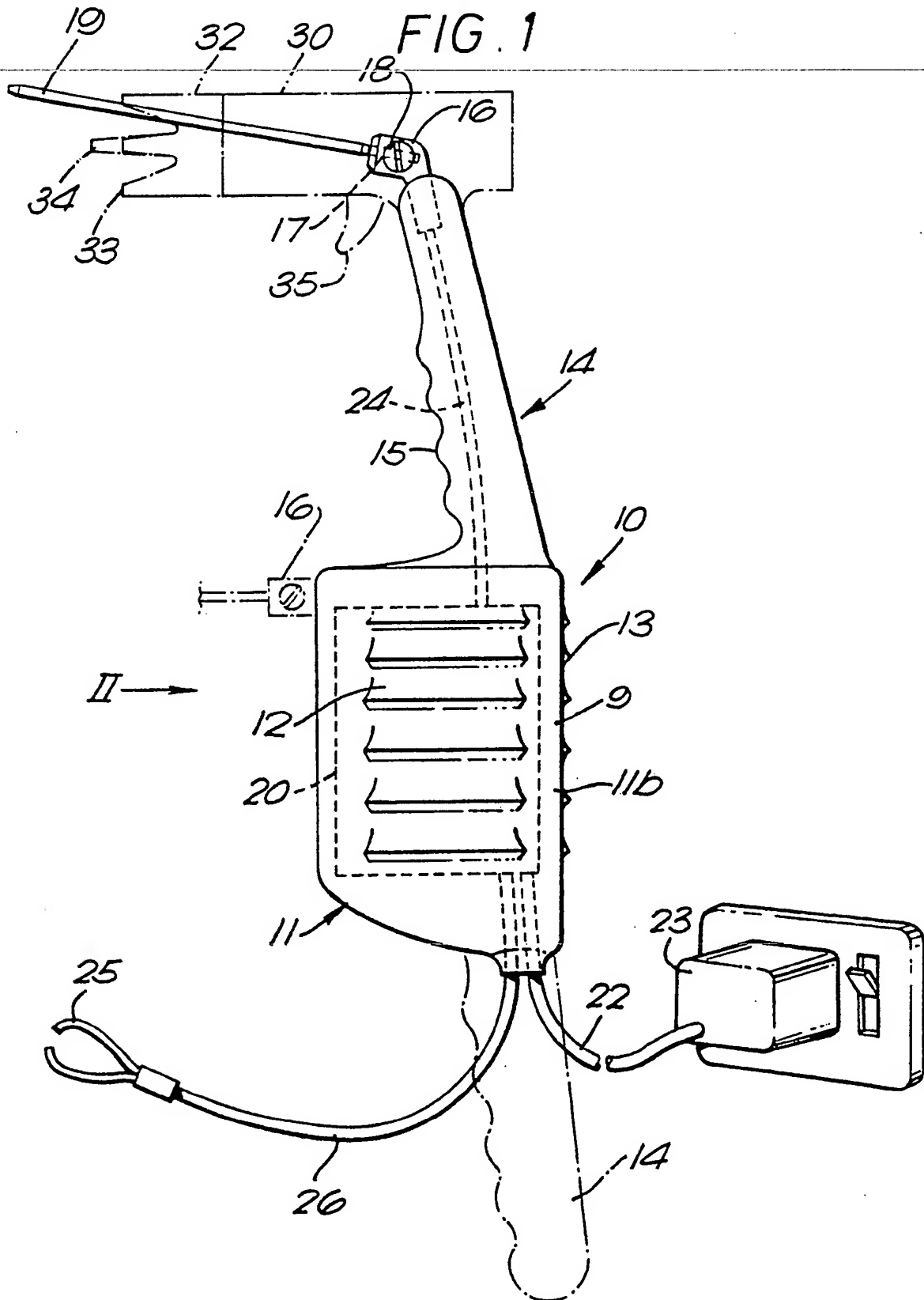


FIG. 2

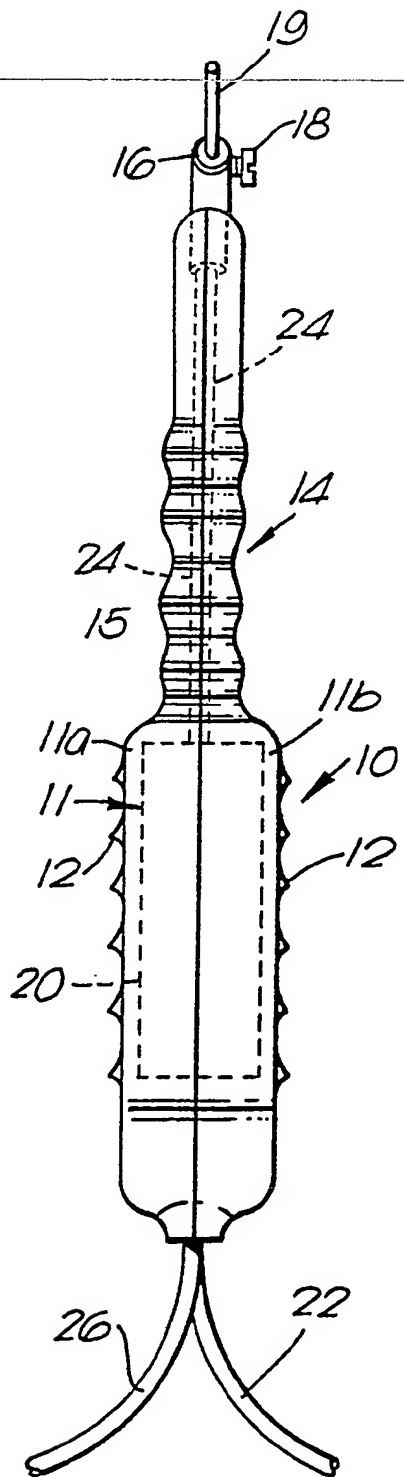


FIG. 4

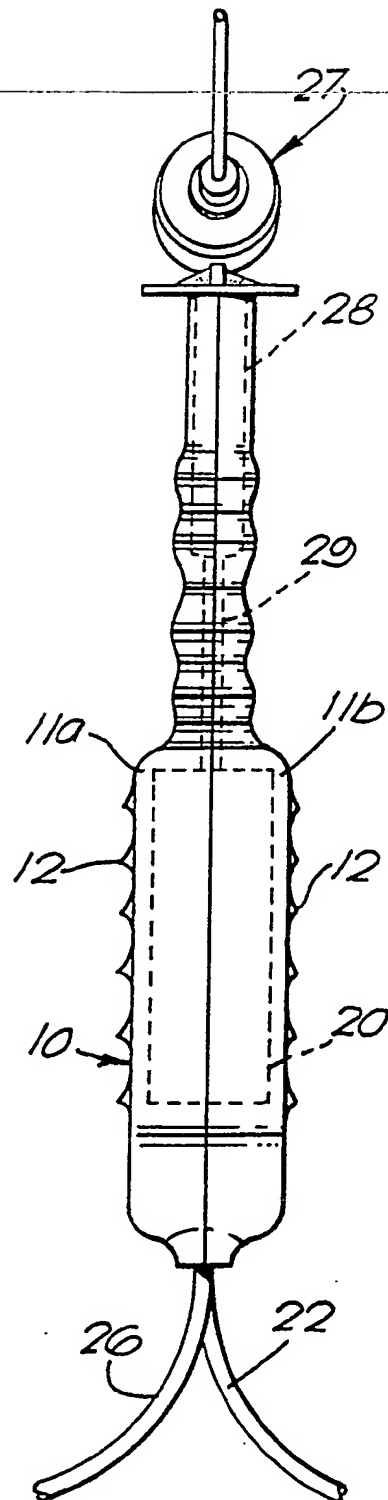
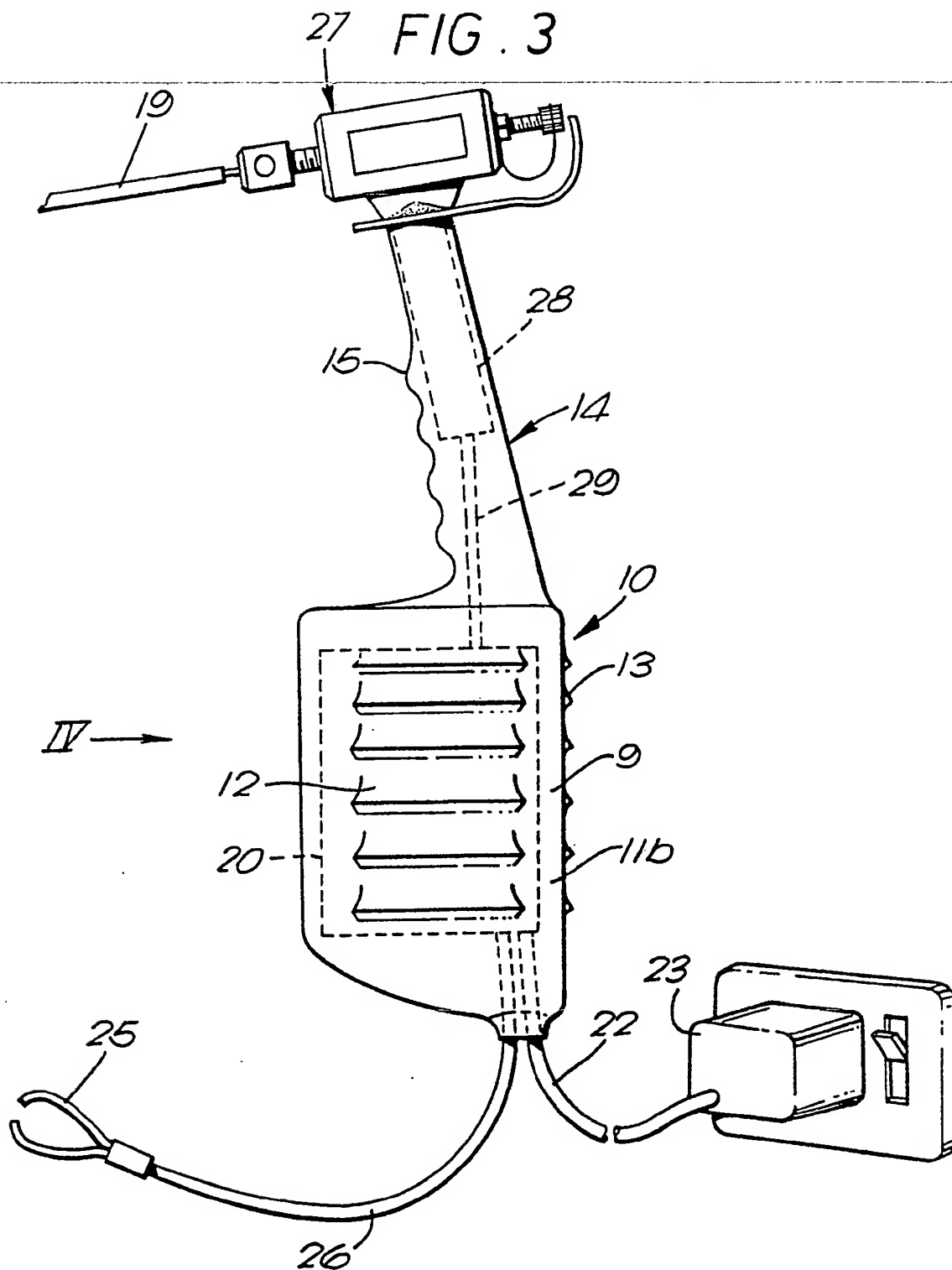


FIG. 3



WELDING APPARATUS

The invention relates to welding apparatus particularly of the electric arc type. The invention is particularly, but not exclusively, concerned with welding apparatus suitable for use in the D.I.Y. market.

Certain type of welding apparatus proposed hitherto comprise a transformer having an input connected, in use, to mains voltage by a cable and two output terminals one being connected to a welding electrode holder and the other being for connection to an earth clamp. The connection both to the welding electrode holder and the holder and the earth clamp are usually relatively short cables and the user needs to have the transformer reasonably close to the workpiece. It will, therefore, be seen that with conventional welders, three cables are necessary and, with the transformer having to be relatively close to the work, the typical known welding set can be somewhat cumbersome. An object of the present invention is to provide an improved welding apparatus which is less cumbersome.

According to the invention there is provided welding apparatus comprising an electrode holder having an electrical transformer mounted thereon and means enabling the transformer to be connected

to an electrical supply.

With such an arrangement, the transformer and electrode holder form a single unit and the apparatus is, therefore, more compact.

Preferably, the means enabling the transformer to be connected to an electrical supply comprises a cable which may terminate at an electrical socket engaging device.

The device may have therein electrical means by which the character of the electrical input can be modified, e.g., by modifying the frequency of current. In the latter case the current frequency is preferably increased. The electrical means is preferably miniaturised to make it easy to handle and locate in a mains supply socket. The cable between the transformer and the aforesaid device may be of any suitable length and, if desired, the device may plug into a socket of an extension lead.

The transformer may also be connected to an earth clamp lead which may be built into the apparatus or may be connected to a terminal on the electrode holder.

Preferably, the electrode holder comprises a casing

housing the transformer, and a handle connected to the casing which is gripped by a user. An electrode holding element on the holder may be arranged on the handle or transformer body but we prefer to arrange it on the handle. If desired, the electrode holding element may be pivotally connected to the remainder of the electrode holder.

In one embodiment, the electrode holding element may be connected to a welding head of the kind described in European Patent Application No.0193275. In that way, the electrode will oscillate in use and will assist the user in striking the arc in welding.

In another embodiment the electrode holder may include a welding device as described in U.K. Patent No.2086287.

The transformer preferably has laminations of a highly conductive type which enables the transformer to be made compact.

Welding apparatus in accordance with the invention will now be described by way of example with reference to the accompanying drawings in which:-

Fig.1 is an elevation of one form of welding

apparatus in accordance with the invention,

Fig.2 is a view of the welding apparatus shown in Fig.1 looking in the direction of arrow II in

Fig.1,

Fig.3 is an elevation of an alternative form of welding apparatus in accordance with the invention, and

Fig.4 is a view of the apparatus shown in Fig.3 looking in the direction of arrow IV in Fig.3.

In Figs.1 and 2, an electrode holder 10 has a casing 11 made up of two interconnected halves 11a, 11b the casing may be formed from a suitable plastics material. As viewed in Fig.1 the lower part of the casing is box-like and is formed with side and end louvres 12, 13 respectively. The casing has an upstanding handle 14 formed with finger grips 15 and supporting at its upper end an electrode holding element 16. The element is formed with a bore 17 and carries a clamping screw 18. An electrode 19 can then be held in the bore by means of the clamping screw 18.

The lower part of the casing (indicated at 9) houses a transformer 20. The transformer is of a

kind having highly conductive laminations thereby enabling the cross-section of the transformer to be substantially reduced for installation in the lower part of the casing. Electrical input to the

primary side of transformer 20 is provided by a mains cable 22 which is connected at its end remote from the casing to a plug 23. The plug is unlike a conventional plug in that it contains electrical circuitry (not shown) by which the frequency of the current can be modified. In the example illustrated, the circuitry preferably increases mains frequency within a range of 50 Hertz to 300 Hertz. The secondary side of the transformer is connected to the element 16 by means of a cable 24 and to an earth clamp 25 by means of a cable 26. If desired, the earth clamp cable 26 could be connected to a terminal on the casing rather than to the transformer direct as shown.

In use, the transformer is supplied with the increased frequency current and the user can engage a workpiece with the earth clamp in the usual way and, by grasping the handle 14 and striking the electrode 19 against the workpiece, can strike an arc to enable welding to take place.

It will readily be appreciated by those skilled in the art of arc welding that the above invention is

considerably less cumbersome than systems proposed hitherto which have required a mains lead from the main supply to a relatively large transformer and cable connections from that transformer to the hand held electrode holder. By providing only the single mains cable 22 the system is far more flexible and easier to use than conventional welding sets.

If desired, at least part of the electrode holding element 26 can be pivoted relative to the handle to enable the angular position of the electrode 19 relative to the handle to be altered.

In Figs.3 and 4, parts corresponding to parts in Figs.1 and 2 carry the same reference numerals. The electrode holding element 16 is replaced by a vibrating head arrangement described in European Patent Application No.0193275. By using the vibrating head arrangement, striking of the arc is considerably easier. The diode 28 used for the vibrating head as described in the aforesaid European Patent Application carried either in the handle 14 or in the lower part of the casing 9 alongside the transformer.

Instead of the electrode holding element 16 or vibratory head 27 being arranged at the upper end

of the handle, the handle could be arranged beneath the lower casing part 9 as shown in broke lines in Fig.1 the electrode holding element or vibratory head being carried by the part 9 of the casing 10

in a suitable position. In such a case, the mains cable 22 could be fed to the transformer through the lower part of the handle 14.

If desired, instead of using an electrode holder element 16 or vibratory head 27, the upper end of the handle or the lower part 9 of the casing 10 as appropriate depending on the position of the handle 14 could be arranged to carry a spot welding arrangement as described in U.K. Patent No.2086287. Such an adaptation is shown in broken lines in Fig.1 where the upper end of the handle 14 is attached to or integral with a cylindrical body 30 having a workpiece engaging element 32 at its front end formed with prongs 33. The cylindrical body 30 contains a holder (not shown) for an electrode 34, the axial position of which can be controlled by means of a trigger 35 as described in U.K. Patent No.2086287. The cable 24 would, in such a case, be connected to the electrode holder.

The term "welding" used herein is intended to cover welding, brazing, soldering and the like.

CLAIMS

1. Welding apparatus comprising an electrode holder having an electrical transformer mounted thereon and means enabling the transformer to be connected to an electrical supply.
2. Welding apparatus as claimed in claim 1, wherein the means enabling the transformer to be connected to an electrical supply comprises a cable which terminates at an electrical socket engaging device.
3. Welding apparatus as claimed in claim 2, wherein the device has therein electrical means by which the character of the electrical input can be modified.
4. Welding apparatus as claimed in claim 3, wherein the electrical means acts to modify the frequency of the current.
5. Welding apparatus as claimed in claim 4, wherein the electrical means acts to increase the current.
6. Welding apparatus as claimed in any of claims 2 to 5, wherein the electrical means is miniaturised.
7. Welding apparatus as claimed in any preceding claim, wherein the transformer is connected to an earth clamp lead.

8. Welding apparatus as claimed in claim 7, wherein the earth clamp lead is built into the apparatus.
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9. Welding apparatus as claimed in any preceding claim, wherein the electrode holder comprises a casing housing the transformer, and a handle connected to the casing which is gripped by a user.
10. Welding apparatus as claimed in claim 9, wherein an electrode holding element is provided on the holder.
11. Welding apparatus as claimed in claim 10, wherein the electrode holding element is arranged on the handle.
12. Welding apparatus as claimed in claim 10 or 11, wherein the electrode holding element is pivotally connected to the remainder of the electrode holder.
13. Welding apparatus as claimed in any of claims 10, 11 or 12, wherein the electrode holding element is connected to a welding head of the kind described in European Patent Application No. 0193275.
14. Welding apparatus as claimed in any preceding claim, wherein the electrode holder includes a welding device as described in U.K. Patent No. 2086287.

15. Welding apparatus as claimed in any preceding claim, wherein the transformer has laminations of a highly conductive type which enable the transformer to be made compact.

16. Welding apparatus substantially as hereinbefore described with reference to Figures 1 and 2 or Figures 3 and 4 of the accompanying drawings.

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